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ORIGINAL ARTICLES.

CONCERNING TRAUMATIC PARALYSES OF THE OCULAR MUSCLES, WITH CASES.[1]

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DURING the last few years a number of important papers on traumatic paralyses of the ocular muscles have appeared. Those by O. Purtscher, H. Friedenwald,[2] Paul Simon,[3] Gustav Ahlström,[4] and Panas[5] may be especially mentioned.

Evidently a paralysis of any one of the ocular muscles may be caused by direct division within the orbit of the mus-

[1] Read before the Section of Ophthalmology of the College of Physicians of Philadelphia, October 16, 1900.

[2] "Traumatic Paralysis of the Abducens Nerve." Archives of Ophthalmology, Vol. XXIII, 1894, pp. 361 and 403.

[3] "Ueber traumatische Nuklearllähmung der Augenmuskeln." Beiträge zur Augenheilkunde, Bd. 3, 1898, p. 31.

[4] "Zur Kasuistik der traumatischen Augenmuskellähmungen." Beiträge zur Augenheilkunde, Bd. 4, 1889, p. 21.

[5] "Paralysies oculaires motrices d'origine traumatique." Archives d'Ophtalmologie, No 10, 1899, p. 40.

cle, its tendon or its nerve, by fracture of the orbital wall or apex, and by an extravasation of blood in, or an inflammation of, the orbital contents. Such palsies in general terms are classified as orbital and peripheral paralyses.

On the other hand, the seat of the paralyzing lesion may be intracranial—that is, basal or cerebral, the last including the nuclear, fascicular and cortical palsies.

Not only may the paralysis be primary, but it may develop secondarily from basal meningitis, hæmorrhage, abscess, or nuclear degeneration, and may appear days and even months after the injury. Finally, a certain number of traumatic palsies must be attributed to operative interference—that is to say, to division of the ocular muscles during operation upon the orbit. To give an idea of the relative frequency of the paralyses of the various muscles of traumatic origin, the table which has been compiled by Ahlström, who has analyzed one hundred and twelve cases from the literature and added nine of his own, may be quoted:

Paralysis of the external rectus (abducens)	73
Paralysis of the superior oblique	7
Total ophthalmoplegia	6
Total oculo-motor (third nerve) paralysis	6
Paralysis of the inferior rectus	5
Paralysis of the superior rectus	5
Paralysis of the internal rectus	4
Total oculo-motor (third nerve) paralysis plus paralysis of the external rectus	4
Paralysis of the inferior oblique	3
Paralysis of the external rectus plus paralysis of the superior oblique	2
Total oculo-motor (third nerve) paralysis plus paralysis of the superior oblique	2
Paralysis of the external rectus plus the inferior rectus	1
Paralysis of the inferior rectus plus the internal rectus	1
Paralysis of the internal rectus plus the superior oblique	1
Paralysis of the superior rectus plus the inferior oblique	1

From this table palsies due to direct trauma of the nerve, tendon or muscle, as it lies in the orbit, are omitted. It is evident that the external rectus is much more frequently affected than any of the other muscles.

The following cases, which I desire to add to the literature of this subject, are invested with certain interesting clinical features.

CASE I. *Paralysis of the Left Inferior Rectus from a Knife-thrust; Advancement of the Severed Tendon with Tenotomy of the Superior Rectus; Cure.* — C. H. W., 35 years of age, colored, came to the Jefferson College Hospital on May 28, 1896, stating that thirteen days previously he was engaged in a fight and received the following injuries: One wound 7.5 cm. long on the vertex of the skull, another 4 cm. in length over the parietal eminence, and a third beginning about 8 mm. from the corneal margin and passing slightly downwards and backwards. The lips of this wound were pouting and from it was springing a mass of granulations such as one sometimes sees after a tenotomy. The vision of each eye was normal and the ophthalmoscopic examination negative.

The movements of the right eye were normal in all respects; those of the left eye complete except the downward rotation, which was practically wanting. With a red-glass the classical symptoms of paralysis of the left inferior rectus were developed.

Under cocaine anæsthesia the granulation tissue was removed and the tendon, severed from its attachment on the sclera, was found in a mass of soft tissue. It was reattached to the sclera, being advanced several millimeters. Diplopia still persisting, the superior rectus was divided, when single vision was obtained when the eyes were in the primary position. Healing followed without incident and the patient was dismissed from the hospital in a few days. He appeared once or twice afterwards, but has since been lost sight of.

I have seen two other cases in which I believe the tendon of the ocular muscle was separated from its scleral attachment by an injury, the one in the eye of a young man, who while running, tripped and fell, striking his eye against the point of a fence paling which was tipped with iron. Not only was there complete failure in the downward rotation of the eye, but there were other injuries to the deeper structures. The patient, however, was not in my charge, and I was able to make only one examination and know nothing of his subsequent history. I assume from the position of the wound near the insertion of the inferior rectus that this injury may have explained the palsy.

In the other case the external rectus of the left eye of a young man was torn from the attachment by the sharp horn of a cow. This patient was also not under my care, although I was present when the apparently detached muscle was secured by another surgeon, very much as was the inferior rectus in the case which I have detailed.

CASE II. *Division of the Pulley of the Superior Oblique During an Operation for the Relief of Abscess of the Orbit Caused by Suppurating Ethmoiditis; Spontaneous Disappearance of the Diplopia, with Restoration of the Normal Rotations of the Eye.*—This case has been reported in some detail,[1] and I will refer to it very briefly. The patient suffered from a large abscess of the orbit due to purulent ethmoiditis. When I made an incision through the brow from the inner to the outer angle in order to open the orbit, I found the inner two-thirds of the superior orbital margin and a portion of the roof of the orbit denuded of periosteum, a carious process having already begun in the orbital margin. The pulley of the superior oblique was recognized and found loosely adherent to a fragment of carious bone which was detached. The patient entirely recovered from the operation, and was discharged from the hospital six weeks later. Diplopia, which was typical of that caused by paralysis of the superior oblique—all the classical symptoms of this palsy being present, slowly disappeared. When the patient was presented to the County Medical Society more than a year after the operation, it was difficult to develop diplopia even with the aid of a red-glass. The lid and eye possessed normal movements; in fact, the function of the eye in all respects was natural. It is now more than four years since the operation, and no one could possibly tell that the function of the superior oblique had ever been interfered with.

CASE III. *Injury of the Superior oblique and Superior Rectus During an Operation for the Removal of a Tumor from the Orbit; Crossed Vertical Diplopia in the Upper Field of Fixation; Homonymous Vertical Diplopia in the Lower Field.*—A girl, 13 years of age, presented herself during the early portion of this year in the Jefferson College Hospital

[1] Medical and Surgical Reporter, November 20, 1897.

with a tumor of the right orbit. After a prolonged medicinal treatment without amelioration my colleague, Dr. H. F. Hansell, very successfully removed the growth, which proved to be tuberculous. He has fully reported the case before the Ophthalmic Section of the American Medical Association at its meeting in Atlantic City during last June. The wound healed promptly, although there was moderate ptosis which improved but never entirely disappeared.

Gradually there was a return of the growth, and a hard mass reappeared in the upper and outer portion of the orbit, and on June 15th of the present year I again opened the orbit through the line of the former incision and found a tumor, which I removed, together with the lachrymal gland which was more or less involved in the process. All of the tissues were much tied down by inflammatory adhesions and it was not possible to recognize individually the orbital structures. The growth proved, like the previous one, to be of tubercular nature. Its more detailed description is reserved for another communication.

The recovery was uninterrupted; the ptosis remained as before, but diplopia now appeared under the following conditions: In the primary position with the lid raised there was binocular single vision but in the upper field there was crossed vertical diplopia, the false image being projected upward and to the left. When the test-light was depressed into the lower field of fixation homonymous diplopia appeared, the false image being projected to the right and downward. Diplopia did not appear until the test-object was raised 15° above the horizontal plane, nor until it was lowered 5° below this position and turned to the left 10° and to the right 25°. This condition of affairs was practically unchanged when the patient was last examined during September of the present year, although the double images were less troublesome and chiefly noted when going up and down stairs.

Of these three cases perhaps the most interesting is the first one, in which it would seem that there is little doubt that the tendon of the left inferior rectus was divided by a knife-thrust, although I can not state positively that it was entirely severed from the scleral attachment, as, for example, it would have been by a tenotomy. Certainly the tendon as

I found it was displaced from its point of normal insertion and the injury appeared to be a direct one. This is especially interesting because Panas has stated in his elaborate paper that detachment of the insertion of the tendon from the sclerotic as a cause of muscular paralysis by direct traumatism to the muscle remains to be proved, at least for the generality of cases. This would seem one in which that proof was pretty positive.

The interest which attaches to Case II, where I know that I detached the pulley of the superior oblique, resides in the restoration of binocular single vision, or, as I have expressed it, in the spontaneous disappearance of the diplopia. Exactly how this is to be explained is difficult to say, unless we assume that in the inflammatory products, which afterwards cicatrized, the tendon formed a new insertion or attachment and again exerted its normal influence upon the rotations of the globe.

The third case is interesting because doubtless the tendons of the superior rectus and superior oblique were more or less involved in the inflammatory processes which had succeeded the first operation and either were detached in part or entirely, or else were injured in such a way that their function was disturbed. With the knowledge of the preceding case I am inclined to think that there will be again a spontaneous restoration of the normal ocular rotations. The slight ptosis which is present is really of advantage to the patient in preventing diplopia.

Case IV. *Paresis of the Right Inferior Rectus Following a Fall Upon the Right Side of the Head; Recovery.*—An unmarried man, 25 years of age, presented himself for treatment on account of blurred vision and diplopia. He gave the following history: General and family history good; eyes always strong and used without discomfort; two weeks before his visit, during a storm at sea, he was thrown into the scuppers of the boat, striking upon the right side of his head and face. Save for a few bruises on his cheek and forehead and a sharp nose bleed, apparently he had suffered no hurt from his fall. Three days later, however, he began to be annoyed with indistinct vision and at times diplo-

pia. This continued, the latter symptom increasing until he sought advice, two weeks after the accident.

The vision of the right eye was $^{15}/_{XX}$, the amplitude of accommodation 8 D., the cornea slightly astigmatic, the pupil reactions normal, the fundus free from disease. The vision of the left eye was $^{15}/_{XV}$, the amplitude of accommodation 9.5 D., no astigmatism, pupillary reactions and fundus normal.

There was crossed diplopia, chiefly in the lower field, the images being one above the other, with a slight inclination of the lower image to the right. There was manifest upward strabismus of the right eye, the lower pupillary margin being about 3 mm. higher than that in the fellow eye; in other words, the ordinary signs of paresis of the inferior rectus were present. When the eyes were rotated downward there was slight lagging of the right behind the left, but no ultimate failure in the excursion.

At first the images were fused by a three-degree prism, base down, before the right eye. Within a few days, however, this fusion was possible only with an eight-degree prism, and still later it took between nine and ten degrees of prism to create single vision.

There was absolutely no sign of fracture about the orbit nor any symptom that could prove fracture elsewhere in the cranium. The patient had been and was annoyed only by the diplopia, particularly in his occupation as a clerk.

On general principles, and partly with the hope that some effusion, probably hæmorrhagic, might be stimulated to absorption, ascending doses of iodide of potassium were ordered. He never, however, took more than thirteen grains three times a day, and soon, on account of digestive and other disturbances, reduced this dose to five grains three times a day.

At the end of two months there was still diplopia, although the patient had become used to it. It was readily relieved by a five-degree prism. Six months later 3.5 degree prism at twenty feet and five-degree prism at the reading distance were required to bring about single vision. The patient was not seen for nearly five months, at which time he returned stating that he had no inconvenience from his former muscular troubles, although careful tests with prisms

still showed, when full action of the inferior rectus was required, a paresis of two degrees. The upward deviation of the right eye noted in the earlier portion of his trouble had disappeared. The patient has been seen many times since this date, now fully six years ago, and although he has not submitted to accurate ocular examination, there is no ordinary sign of orbital muscle palsy.

CASE V. *Paralysis of the Left Superior Rectus and Left Levator Palpebræ Following a Fall Upon the Left Side of the Head and Forehead; Tenotomy of the Left Inferior Rectus; Complete Recovery.*—A married woman, about 26 years of age, on the Fourth of July, 1891, was thrown from a buggy striking the left side of her head and left supra-orbital region, probably against a stone in the road. The immediate result of the accident was extensive ecchymosis of the injured region, swelling of the eyelid, unconsciousness, and for a number of days all the symptoms of severe concussion of the brain.

After these symptoms had subsided the following ocular conditions were present: Partial left ptosis, the upper lid covering the pupil, from which position it could not be elevated; slight downward strabismus of the left eye and crossed diplopia with superimposed images in all portions of the field, the images being fused with the eyes in the primary position by a prism of fifteen degrees, base up, before the left eye.

Both discs were hazy, the veiling of the margins of the left optic disc being quite marked. The vision of the right eye was normal, that of the left $^{20}/_{XL}$.

There was no paresis of accommodation. One month later the ptosis was slightly better, the edge of the upper lid being on a level with the upper margin of the pupil. The degree of superior rectus palsy was unchanged, in the primary position fifteen degrees of prism being required to fuse the images, above the horizontal level twenty-two degrees.

At the end of two months, during which time the patient was treated with iodide of potassium, later with strychnia and at intervals with electricity, the ptosis entirely disappeared, the action of the levator being apparently perfectly

restored. There was no change, however, in the degree of the superior rectus palsy.

Two more months of similar treatment produced no effect and therefore the tendon of the left inferior rectus was divided, laceration of the capsule being avoided. The immediate effect of this tenotomy was an overcorrection of three degrees. Three weeks later double vision was absent in all portions of the field of fixation except in the extreme lower field.

Vision was now normal in each eye and the accommodative power 9 D. The veiling of the edges of the optic disc had also disappeared. The refraction proved to be a low simple astigmatism and a glass was given correcting this anomaly, to which was added a three-degree prism, base down, to correct the tendency to diplopia in the lower field—the remnant of the overcorrection. This diplopia persisted for three months, at the end of which time it was not possible to obtain double images in any portion of the field of fixation, and with the Maddox rod there was practically orthophoria at twenty feet, actually an esophoria of two degrees. Prismatic glasses had long been discontinued and the patient no longer complained of any double vision unless her general condition was below par, when sometimes there would be transient diplopia. She has been seen many times since the date of the last examination recorded, and the ocular conditions are normal.

Case VI. *Traumatic Paresis of the Right Superior Oblique Following a Fall on the Right Supraorbital Region; Later Paresis of Accommodation; Recovery.*—A boy, healthy in all respects, 10½ years of age, in the first week of January, 1896, while skating fell striking heavily upon his forehead over the right eye. He was somewhat dazed, but not unconscious, complaining for a time of nausea. A few days later it was found that he was unable to read with any degree of comfort and he complained of pain in the forehead and in the eyes. When he was examined, two weeks after the accident, vision in each eye was $^{6}/_{5}$. The amplitude of accommodation was 14 D., the pupil reactions were normal, each optic disc was congested, and the retinæ were markedly streaked in the neighborhood of the papillæ.

With eyes in the primary position there was homonymous diplopia, the images being one above the other, that of the right or affected eye being lower than its fellow and inclined to the sound side. The lateral separation was obliterated by a prism varying from two to four degrees, while the vertical separation did not appear to be much more than one degree. The youth of the patient rendered it difficult to study the relation of the double images to each other with accuracy.

The patient was placed upon small doses of iodide of potassium and returned for examination in three weeks, vision, as before, being $^{6}/_{V}$ in each eye. The lateral separation of the images was now two degrees, the vertical separation about one-half degree. He no longer complained of diplopia and the nausea and pain had disappeared.

He was not seen for four months, when he returned, no longer complaining of diplopia, which had long since entirely disappeared, but stating that his vision was markedly blurred and that he could not see to read. The vision of the right eye was now about $^{6}/_{XXX}$ and the left $^{6}/_{IX}$. A + .75 D. before the right eye brought the vision back to $^{6}/_{V}$, and with a + 4.50 D. added to this lens, J. 1 could be read from five to seventeen centimeters. The left eye accepted no glass for the distant point, and without a glass the near point was 12.5 cm., or in other words, the accommodative power was 8 D. The congested condition of both discs and retina remained unchanged.

Strychnia was ordered and in two weeks the vision of the right eye was $^{6}/_{XV}$ without a glass, of the left $^{6}/_{V}$. The right eye had partly regained its accommodative power; the left eye was practically normal so far as this function was concerned. At the end of another month vision was $^{6}/_{VI}$ in each eye and the accommodative power 10 D. in each, not quite so great as it had been at his original visit when the near point had been 7 cm. There was no diplopia and no deviation of the eyes in any way, even the Maddox rod failing to show a faulty tending of the visual lines. After complete atropinization the refractive error was found to be +.75 D. in each eye. There was no corneal astigmatism.

Since using these glasses the slight asthenopia of which he complained has disappeared.

CASE VII. *Paresis of the Left Inferior Rectus Following a Fall on the Head, Succeeded by Concussion of the Brain; Recovery.*—An unmarried man, 22 years of age, in good health, and with no history of ocular trouble, came on October 14, 1896, to obtain relief from diplopia. He gave the following history: Three weeks before he was thrown from his horse and fell in a field of plowed earth striking heavily upon his head; where exactly was the chief impact of the blow he did not know. There were no external wounds. He was picked up unconscious and remained so for three days. His attending physician, Dr. Radcliffe Cheston, writes that during this period there was severe concussion of the brain, that shock was very marked, and that for a week the pulse was slow and feeble.

On regaining consciousness he noted the double vision. Examination gave the following results: Vision in each eye $^{6}/_{VI}$, normal ophthalmoscopic appearances, amplitude of accommodation 7 D. in each eye. The pupil reactions were normal. There was crossed diplopia in the lower field, or at least, chiefly noted in the lower field, but not entirely absent even in the upper field. In this lower field the images were one above the other, that of the left or affected eye being lower than its fellow and inclined to the sound side. Apparently the image appeared to stand behind the other. The separation of the images, when the test object was moved from the lower field, was greater than when on the horizontal level or above the horizontal level. If the test object was extended sufficiently far into the upper field of fixation, the images were fused. Their vertical separation was annulled by a prism of six degrees and the lateral separation by a prism of three degrees.

In all respects the study of the double images corresponded to a paresis of the left inferior rectus, with the single exception that the inclination of the false image was to the sound and not to the affected side, which might perhaps be accounted for by a coexisting esophoria. The difficulty of distinguishing between a superior oblique palsy and an inferior rectus palsy under these circumstances is well known.

The treatment consisted of small doses of iodide of sodium, which was continued for two weeks, at the end of which time diplopia had almost disappeared.

CASE VIII. *Paralysis of the Left Superior Oblique Following a Fall on the Head Succeeded by Severe Concussion of the Brain; Recovery.*—A married man, about 60 years of age, in good health, fell from a trolley car and struck upon his head and point of his shoulder. The fall took place not far from his own house, to which after lying on the track in a dazed condition, he managed to make his way. When examined by his physician, Dr. Eckfeldt, and later by Dr. De Forest Willard, he was found to have all the symptoms of severe concussion of the brain and some symptoms which indicated fracture, namely, hæmorrhage from the left ear, although Dr. Willard in his account says that the evidences of fracture were uncertain.

Sixteen days later when I examined him, and his intellect was perfectly clear, he was complaining of diplopia, which had been present from the very start, or as soon as he had sufficiently collected his senses to observe the disturbance of vision. With the usual tests there was homonymous diplopia, chiefly in the lower field, the image of the left or affected eye being lower than its fellow and inclined to the sound side. Movement of the test-object downward and to the left increased the obliquity of the images. The vertical separation was neutralized by an eight degree prism and the lateral by a four degree prism. He was placed upon ascending doses of iodide of sodium and took also strychnia. One month later there was decided improvement, although the symptoms of left superior oblique paresis were still present. The lateral separation of the images was now two degrees and the vertical separation six degrees. Recently this patient was again examined and the ocular movements are entirely normal and the eyes natural in all respects.

Fortunately, recovery was complete in all these five cases and, therefore, the localization of the lesion is at best a matter of speculation. All of them, I think, may be classified with the intracranial palsies. In three of them, Cases V, VII and VIII, there was severe concussion of the brain, and in one of them, Case VIII, hæmorrhage from the ear,

which indicates the possibility of a fracture, although the surgeons in charge were not sure of this point. Fracture of the base can not be excluded because the classical symptoms of this disease are not present. In Roberts' famous case, quoted by Purtscher, only the slightest symptoms of cerebral concussion were present, together with paralysis of the abducens, and yet the patient died four months later, and there was found a transverse fracture through the upper third of the right temporal bone, and that the nerve had been torn at the level of this fracture. Therefore, perhaps, with the exception of Case V, these are best explained by a lesion at the base of the skull.

Case V is excluded from the basal and orbital classification because it is difficult to conceive how an injury of the nerve in either of these regions would not also have affected the ciliary muscle and iris, which were normal. A more probable explanation is a nuclear lesion, one, moreover, situated in the anterior portion of the nucleus affecting that portion which controls the levator palpebræ and the superior rectus.

It is difficult to place the lesion in Cases IV and VI, especially in the former. The patients suffered almost not at all except from the ocular muscle palsy which followed the fall, that is to say, there were no symptoms referable to the orbit or the cranium. The entire absence of orbital symptoms would probably exclude the theory that the nerve or its tendon was pressed upon by an exudation into the orbital contents. It is hard to believe that there could have been a fracture or any decided lesion at the base with so little general disturbance.

Case VI may perhaps be explained by a basal lesion, perhaps by a nuclear lesion, but like the preceding one, does not lend itself readily to interpretation. It is interesting to observe that in two of these cases the superior oblique was affected, which Purtscher remarks is probably more often injured than one would suppose, its symptoms being masked by other palsies that may be present.

MEDICAL SOCIETIES.

THE TREATMENT OF CHRONIC GLAUCOMA.

A Discussion Before the Ophthalmic Section of the British Medical Association, at Its Annual Meeting at Ipswich, July–August, 1900.

I.—Francis Richardson Cross, F.R.C.S.,

Ophthalmic Surgeon Bristol Royal Infimary; Surgeon Bristol Eye Hospital.

[concluded from page 316, october number.]

Case X.—A case of high myopia, with simple glaucoma under observation for eighteen months; at first improving, lately getting worse. J. C. S., 42 years of age, a solicitor's clerk, came February 11, 1899. For several months his eyesight become very uncomfortable without known cause. He had worn strong concave lenses for many years. V., R.—13 — 1 cyl. $^{6}/_{18}$; L. — 13 — 0.50 cyl. $^{6}/_{18}$ — 10; 1 J. each. No defect of right visual field. Well-marked cupping of both optic discs and symptoms of chronic glaucoma which vary. Ordered pilocarpin drops. July, 1900. Spectacles give $^{6}/_{15}$; both fields of vision less good and suggestive of atrophy as well as of glaucoma, but the optic discs clearly indicate excessive intraocular tension. He is to have iridectomy or sclerotomy done in October.

Having endeavored to show that a chronic glaucoma, however indefinite and insidious its early symptoms may be, will eventually destroy the sight, either from gradual atrophy of the nerve elements or by the accession of inflammatory strangulation, I must now consider how the prognosis is modified by surgical interference. The causation of chronic glaucoma is probably analogous to that of the other more acute forms of this disease. The heightened tension is gener-

ally due to local mechanical interference with the excretion at the filtration angle of the eye rather than to some more central nerve irritation which may cause dilatation of the pupil, contraction of the intraocular blood-vessels with heightened blood pressure, and increase of the intraocular secretion.

On the latter hypothesis Jonnesco, of Bucharest, has recently advocated resection of the superior cervical ganglion of the sympathetic as a cure for any kind of glaucoma. He has performed this operation on seven patients, and in each case the ocular tension has been, he says, immediately and permanently reduced and the pupil has become markedly and permanently contracted. He considers that the resection is particularly applicable to quiet chronic forms of the disease in which iridectomy seems to give only doubtful results. Demicheri, of Montevideo, reports brilliant results in two other cases of glaucoma, and the operation is a well recognized surgical procedure for thyroidal and other diseased conditions. But even though the patient willingly submits to such a heroic measure and the effects produced on the eye prove to be satisfactory and permanent, the surgeon could not undertake it without great anxiety as to the wide ultimate effect on the control of the sympathetic nerve that might be likely to result.

We all admit the great value of a good iridectomy for the correction of the filtration channel in ordinary glaucoma; if it fails us in "simple" cases it is probably either because we hesitate to operate until degenerative changes are too far advanced, or that a severe atrophy has been the essential element in the case throughout, and continues to impair the sight despite the relief that has been given by operation to the slight increase of tension that has accompanied it.

In my experience the results of iridectomy in simple glaucoma have been satisfactory, particularly when compared with those that follow non-interference. Improvement after operation is not always immediate, especially if there is considerable atrophic complication, but it will ultimately take place; in some cases improvement is permanent, while in others it definitely prolongs the period during which the patient retains his sight.

I append notes of some of my private cases:

CASE XI.—Mrs. B., came March, 1885, complaining of long-continued worry in the left eye. Fifteen months previously she had lost the sight of that eye; it gradually cleared but remained always foggy. Right eye vision good, left eye $^{6}/_{9}$; 1 J. badly; deep white cupping of papilla, not up to disc margin; T. — 1. In June an attack of haze, recovering in a few days; V. $^{6}/_{18}$. November 23, 1885. Iridectomy of left eye. March, 1886. In the menopause; both eyes are uncomfortable; no definite prodromata of glaucoma, with lenses, both $^{6}/_{9}$ 1 J.; uses weak myotics as required. December, 1886. Haloes over right eye. May, 1888. Continued symptoms of insidious glaucoma both, but vision $^{6}/_{6}$ and $^{6}/_{9}$. March, 1891. Still good vision in both, but increasingly liable to haloes, fogs; no conjunctival congestion; anterior chambers not definitely shallow; no arterial pulsation; fields both narrowed; R. T. — 1. December, 1896. R. glaucomatous; no congestion, but vision in both with lenses is $^{6}/_{8}$. January, 1897. Right iridectomy. February, 1899. Has used no drops in either eye for a year; has had no symptoms in either for that time. Both see perfectly with suitable lenses, and the fields have been practically perfect since the last operation. She now has no anxiety regarding her eyes. There is a small cystoid cicatrix in the left.

CASE XII.—Miss F. E. P. consulted me February 16, 1893. She had myopic astigmatism and saw well with suitable lenses. In May, 1899, she returned complaining of great discomfort in the eyes since January. The left eye was the worst, and she had noticed she could only see with it in the temporal field. The perimeter showed the nasal sides of both fields equally narrowed, but in addition the left field was affected on the temporal side. Vision right eye with spectacles $^{6}/_{9}$. Vision left eye with spectacles $^{6}/_{19}$ letters (only on left of board). Both showed definite glaucoma cupping, no other definite objective symptoms. After using pilocarpin for a few weeks vision and fields somewhat improved; but she returned again in October with the sight more confused and uncomfortable, and on October 16th I did double iridectomy under chloroform. Since this vision has been much more comfortable, but it is still at times confused. On May

18, 1900, central vision of each eye with spectacles was $^{6}/_{9}$, but with the left eye only the letters in the left field were seen. The fields of vision improved after the iridectomies, have somewhat deteriorated since, but judging from Case IX they are likely ultimately to improve as the glaucoma element is now removed.

Case XIII.—Mrs. F., 72 years of age, consulted me on April 20, 1898. The right eye had been removed ten years previously after an unsuccessful iridectomy for glaucoma. The left eye had given no trouble until an attack of influenza with congestion of the lungs a year ago, when for a time the sight was foggy, and she saw occasional haloes, but it recovered. December, 1897, another attack of congestion of the lungs was associated with other subjective symptoms of defective vision, and the eye continued to get worse. Vision, $^{6}/_{18}$, + 1 $^{6}/_{9}$, + 4.50 J. 2 badly. Pupil rather full. Anterior chamber shallow. T. + 1. No congestion. Scleral vessels slightly enlarged. Eserine ordered. Pale flat nerve. May 9, 1898, vision worse; looks eccentrically. Field of vision lost at fixation point. Iridectomy on May 14th. June, 1898, central field regained; October, 1899, sight returned to $^{6}/_{12}$. But there is now a very diminished field 10° around the fixation point only; 1900 she retains her sight; but periodically she has a course of strychnine injections in the temple. The nerve in this case was never cupped, but was white and flat; but glaucoma was very distinctly present, and the iridectomy done two years ago undoubtedly saved the patient from blindness.

Case XIV.—C. B., 63 years of age, consulted me in July, 1889, for peculiar and misty vision in his left eye. V., R. $^{6}/_{6}$, 1 J.; with lens, L. $^{6}/_{12}$, 6 J. Left optic nerve pale, not cupped, artery doubtfully pulsates. Pilocarpin. November, 1890, L. V. $^{9}/_{24}$. Field narrowed up to 10° around the fixation point. T. + 1, no cup nor pulsation at the optic nerve. September, 1892, left eye blind, right normal. December, 1895, while shooting, acute inflammatory glaucoma attacked left eye. I did iridectomy, and shortly afterwards removed the globe. Probably if I had done iridectomy when the eye saw $^{6}/_{12}$, six years previously, I shoul have saved it. The right eye gave no cause for anxiety till March, 1897, when it be-

gan to show slight symptoms of incipient glaucoma. C. B. was now 71 years of age, gouty, and declined operation unless I urgently wished it. Slight cataract in the lens had reduced the vision to $0.75^{6}/_{7}$, the field was full, no objective evidence of glaucoma. He was given pilocarpin, and shot through the winter of 1890. His visual field was then narrowing, but his central vision was practically perfect; there was a marked pulsating artery. On January 2, 1900, he returned. Central vision still good, but the field narrowed to within 10° or 15° of the fixation point. There was no marked tension. The optic nerve was white and flat. There was very definite pulsation of the main trunk and branches of the central retinal artery. A good peripheral iridectomy was done on the 6th without trouble, but an unusual amount of hæmorrhage followed into the aqueous chamber. On the 7th a large blood clot occupied the aqueous chamber, and vision remained at bare p. l. for three days. On the 11th patient could count fingers. Slight daily absorption of the clot with fresh scarlet hæmorrhage on the upper part of the older blood continued for three weeks, during the whole of which time he was kept quiet in bed and could scarcely see at all. Gradual improvement then commenced, and on February 20th a chart was taken showing much widening of the field. Central vision had also improved to $^{6}/_{9}$ with — 2 cyl. and to J. 6; but there was still slight hæmorrhagic exudation into the aqueous chamber. On March 26th sight still improving; hæmorrhage gone. Optic nerve flat and white, a small central artery showing no signs of pulsation. In May the patient was comfortable and had no unsatisfactory symptoms. He continues to improve.

Sclerotomy seems likely to be of great value as a remedy in the earlier stages of chronic glaucoma, before the sight is much reduced or the eyeball damaged. I have been well satisfied with the results of this operation in a good many cases, and it is of special value when the disease is complicated by degeneration of the intraocular fluids with any forms of uveal inflammation.

The sclerotomy I perform was, I believe, first suggested by Snellen. A broad keratome is passed—as in the first step for making an iridectomy—from a puncture point about two

mm. outside the corneal margin into the aqueous chamber as nearly as possible at the corneo-iritic angle. The wound is made as peripheral and as wide as practicable, so as not to touch the edge of the lens or its capsule. The knife is very carefully withdrawn to avoid prolapse of the iris, which has been further guarded against by previously keeping the pupil fully contracted under eserine, and may be still further assured by a hypodermic injection of morphine.

Sclerotomy, as usually done by a Graefe knife, appears to me to be more difficult of proper execution. It is less easy to control the absolute anatomical position of the wound—prolapse of the iris is more likely to occur, particularly near the point of counterpuncture—and more definite scarring of the eye is likely to result with the possibility of unpleasant sequelæ. Sclerotomy with a keratome can give a satisfactory result without any trace of the operation remaining.

The following are notes of cases where sclerotomy was done:

Mr. J. L., 64 years of age. Chronic glaucoma of four years' standing in right eye; one year's standing in left eye. The vision was reduced to: R. E., V. finger counting in the upper and outer field; the right field was lost excepting a small area on the temporal side of the fixation point. L. E., V. $^{5}/_{24}$, left field reduced to 5° on the nasal side $\frac{30°}{50°} \times 5°$. Slight choroidal damage in each eye and some synchysis. Tension in each eye + 1. The right optic nerve was white and cupped without strangulation of the vessels; no cupping was observable of the left optic nerve, but the main artery pulsated. After use of eserine for two or three days, sclerotomy on each eye resulted in improvement of the field and in vision of the L. E. to $^{6}/_{12}$. Some improvement of central and peripheral vision in R. E. Much increased comfort in power of using the eyes. Disappearance of pulsation in the retinal artery and lessened cupping of the disc. The patient has lately written that his L. E. continues to improve.

Mrs. K., with chronic non-inflammatory glaucoma of eyes and very severe discomfort in both. Symptoms in L. E. of seven years' standing, in R. E. of four years' standing.

Vision: L. E., hand movements; R. E., $^{5}/_{9}$, with markedly contracted field. Sclerotomy was done on L. E.; iridectomy was done on R. E. The right vision gradually improved to $^{5}/_{6}$; J. with improvement of the field. L. E. saw 19 J. Both were entirely relieved of discomfort, and from all haloes, fogs, and subjective sensations The improvement lasted for some months after the operations, and still probably continues.

Sclerotomy by the keratome is of great service at the coloboma when eyeball tension has recurred after having been temporarily relieved by an earlier iridectomy. The interval between the two operations can be varied from a week or two to any period, according to the necessities of the case, and under these circumstances may be done again and again without danger to the eye and with repeated relief of the symptoms.

Thus in November, 1894, I did iridectomies for chronic glaucoma in A. E. W., 36 years of age. His left eye was blind; the right had $-1^{5}/_{6}$. In December, 1895, R. E. had a full field and good vision, but occasional insidious symptoms of glaucoma. In January, 1897, vision was misty, with spectacles $^{6}/_{18}$. Media somewhat hazy and tension + 1. In February I did sclerotomy through the coloboma; a week afterwards vision had improved to $^{6}/_{12}$. He went on satisfactorily with his duties as a solicitor's clerk until November 25th, 1898, when he was complaining of fogs and haloes. T. —, but the field of vision full. I again did sclerotomy through the coloboma, with restoration of sight and comfort. He continues his work, and saw well in the spring of this year.

It would seem possible that a very few eyes in which symptoms of chronic glaucoma have appeared should right themselves, a few others are cured by myotics, but, in the large majority of the cases, the glaucoma symptoms progress with increasing damage to the eye tissues and deterioration of the sight. Many of the patients are old and out of health and may not consent to operation in the cases where it is thought the proper course to recommend. But both on theoretical grounds and from the recent study of my cases, I am of opinion that, as a rule, when the patient's symptoms lead to an undoubted diagnosis of simple glaucoma, even where sight is good and the field of vision scarcely narrowed, and

however serious it may seem to be to subject an eye which some might consider devoid of serious symptoms to the risks of operative interference, we ought to advise that a peripheral incision should be made through the corneo-iritic angle to open the filtration channels, either with or without the removal of a piece of iris, according to the nature of the case, and then operation should be resorted to before the optic nerve is badly cupped, the retina seriously pressed on or the iris jammed at the corneo-iritic angle before the tissues of the eyeball are permanently damaged or the power of vision is definitely impaired.

II.—John Hern, M.D., F.R.C.S.E.,

Ophthalmic Surgeon, Darlington Hospital.

Dr. Hern said: In the treatment of chronic glaucoma there is the "one thing needful," namely, an early diagnosis, for the earlier the operation the greater the chance of success. The point raised by Mr. Cross is important, namely, the atrophy of the optic nerve, so frequently met with, and this fact has not been sufficiently dwelt on by writers on the subject. In my case I have taken it to be due to the increased pressure in the vitreous chamber, and therefore due to the glaucoma, at any rate the atrophy was diagnosed after the glaucoma in cases closely watched. My practice invariably is, in cases of chronic glaucoma, to do an iridectomy as early as possible, followed by a method described in a paper read at the Utrecht Congress last year, and published in the *Transactions*. In reply to a question by Mr. Richardson Cross, Mr. Hern said he used a small double-edged Graefe's knife, which he passed backwards through the cornea and suspensory ligament (in coloboma of iridectomy) into the vitreous chamber, taking care to keep the cutting edges away from both the lens and ciliary body. In order to still further open up the communications between the aqueous and vitreous chambers, the handle of the knife was rotated in the direction of its cutting edges.

III.—Henry Work Dodd, F.R.C.S.,

Ophthalmic Surgeon to the Royal Free Hospital, and Surgeon to the Royal Westminster Ophthalmic Hospital.

Mr. Work Dodd said he considered it an undoubted fact that iridectomy had been found to fail in many cases of chronic glaucoma, and that they were now in a peculiarly uncertain state as to the best treatment for this painful disease. If, as Dr. Jannesco, of Bucharest, stated, the removal of the superior cervical ganglion of the sympathetic had a beneficial effect then they had a totally new treatment for its relief. Mr. Work Dodd having found the following suitable case he performed the operation: The patient was a woman, 62 years of age, who had suffered from chronic glaucoma off and on for fourteen years, during which time her vision had been slowly but steadily diminishing. She was never quite free from pain and exacerbations were frequent, nausea was present but no vomiting, and these symptoms were somewhat relieved by eserine. In January, 1891, her vision in both eyes was $^{6}/_{12}$, but this failed in the right to $^{6}/_{24}$ and in the left to $^{3}/_{60}$. The fields of vision very slowly contracted, chiefly on the temporal side. The tension varied, but was never above + 1 in either eye during a subacute attack. The The patient was subject to dysmenorrhœa and two years ago had hæmorrhages from the mouth, probably the result of a gastric ulcer. She was thin and anæmic, but otherwise healthy. In the upper temporal quadrant of the field there was a scotoma and the center of the field was blurred and indefinite. Assisted by Mr. Roughton, Mr. Dodd cut down on the anterior border of the right sterno-mastoid, and after a careful dissection he exposed the cervical sympathetic, the superior ganglion was then seized with forceps and torn away from its upper attachment, while the other end was divided at the lower border of the wound, about one and a half inch, including the ganglion being removed. The wound was closed and the patient did well. The pupil afterwards was found to be contracted and the tension of the eye normal, but sufficient time had not yet elapsed in order to speak as to the permanent results. Mr. Dodd, in summing up, said he thought the operation undoubtedly a severe one as it was

usual to perform it on both sides of the neck. In addition very great care was needed in dealing with such important structures as were met with in the dissection. If this operation were found to arrest the disease, preserve the sight, and relieve the pain, then he considered that it might be recommended.

IV.—Karl August Grossmann, M.D., F.R.C.S.E.,

Ophthalmic Surgeon, Stanley Hospital, Liverpool.

Dr. Grossmann said: Chronic glaucoma is a disease which fortunately does not come as frequently under my observation as might be, neither in my hospital nor in private practice. In the advanced stage the prognosis is, as a rule, unfavorable. Myotics will be tried first, and I prefer pilocarpin to eserine. The operative treatment is either iridectomy or sclerotomy. The latter, done with a broad Graefe's knife, is preferred by me. I have not tried the heroic extirpation of the upper cervical ganglion. Massage has given encouraging results, especially in the form of the mallet driven by a galvano-moter. One mode of treatment, especially when the patient objects to a more serious operation, I should like to mention particularly, namely, subconjunctival injections of (from 6 to 20 per mille) sterilized solutions of sodium chloride. The rapid disappearance of pus from the anterior chamber in hypopyon and the decrease of the intraocular pressure led me to try this mode of treatment, which can be repeated for weeks and weeks, applied every few days and has given very encouraging results in my hands.

V.—Ernest Dykes Bower, F.R.C.S.Ed.,

Surgeon and Ophthalmic Surgeon, Gloucester General Infirmary.

Mr. Dykes Bower said: I suppose we all agree with Mr. Cross when he says that nearly all cases of chronic simple glaucoma if left to themselves ultimately end disastrously with complete loss of sight, at the same time it is undoubtedly true that cases do now and then occur where the disease may be kept in abeyance for long periods of time by the use of myotics. I have at the present time under my care a patient who has been under observation for at least six

years with undoubted chronic glaucoma with shallow anterior chamber, occasional attacks of dimness of vision and increased tension, but during the whole of the time mentioned the disease has made no progress, and the patient goes about her work with comparative comfort. While agreeing entirely that as soon as one is certain of the diagnosis of glaucoma operation should be resorted to, still one does sometimes hesitate to operate in the very early stage of the disease where central vision is good and there is perhaps nothing more than slight contraction of the nasal field, because the operation itself will probably give rise to some deterioration of vision, and the patient is thus apt to blame one for leaving him in a rather worse condition than he was before, and it is in these cases that Mr. Cross' suggestion that sclerotomy rather than iridectomy should be performed appears to me to be a valuable one. I do not wish to be understood as arguing against early operation, only one must be careful to point out to the patient that the operation which is performed for the cure of the glaucoma may itself leave the sight a little worse than it was before, and perhaps for this reason, if for no other, it may be advisable in the very early stage of the disease to perform sclerotomy rather than iridectomy, while the latter operation can be resorted to if the former fails. One word as to the ultimate results in chronic simple glaucoma after operation. My experience has been that the majority of cases eventually do badly, but still, if the sight can be retained for a few years only, as is frequently the case, no one can doubt the value or indeed the absolute necessity of early operative treatment.

VI.—George A. Berry, M.B., F.R.C.S.E.,

Ophthalmic Surgeon to the Royal Edinburgh Infirmary, and Lecturer on Ophthalmology in the University of Edinburgh.

Mr. Berry observed that he had seen a number of cases of chronic glaucoma kept in check for many years by myotics —notably one in which haloes and obscuration had occurred daily for eighteen years, and for which pilocarpin was regularly used. His practice was to use myotics until the disease entered the confirmed stage, when he performed iridectomy.

He had never, however, seen the enlargement of the field as the result of this operation, although his experience of it had been sufficiently satisfactory to cause him to think that it was an absolute duty to perform iridectomy for chronic glaucoma. He had seen many cases ten to fifteen years after operation in which the vision had not deteriorated. In his experience the cases giving the worst prognosis after iridectomy were those in which there existed a central or paracentral scotoma. He preferred iridectomy to sclerotomy, and usually did both with a keratome. The best results were got in cases in which rapid and smooth healing of the wound took place. No doubt this was simply due to a cystoid or irregular cicatrix being the result of tension which had not been reduced. In these cases massage was sometimes useful if forcibly done. Scleral puncture he had tried as recommended by Priestley Smith as a preliminary in some cases (not usually the chronic ones) to iridectomy. He had never done removal of the cervical ganglion. The operation had been done for other reasons by some of his surgical colleagues, and the performance of it did not, he understood, present any great difficulty.

VII.—Charles Devereux Marshall, F.R.C.S.,

Assistant Surgeon to the Royal London Ophthalmic Hospital, and Ophthalmic Surgeon, Victoria Hospital for Children.

Mr. Devereux Marshall thought the operation suggested by Mr. Hern was an extremely dangerous one, for he could hardly imagine that a knife could be passed between the edge of the lens and ciliary body without at least producing a traumatic cataract, and possibly a wound of the ciliary body as well. He asked if an eye upon which this operation had been performed had ever been examined pathologically, so as to ascertain the exact amount of injury caused.

VII.—William Arthur Brailey, M.A., M.D., M.R.C.S.,

Vice-President of the Ophthalmological Society, London; President of the Section.

Dr. Brailey thought that if the tension were reduced to

normal permanently there was no reason to believe that the disease could advance. He thought that there were many fallacies in observations made with a perimeter, and while coarse tests with a rapidly-moving object, whether the fingers or a ten-millimeter white square, showed a good field, yet fine tests gave very great contraction; and this would explain easily the considerable enlargement of the field that might undoubtedly occur under myotics. With regard to prognosis, although he did not consider it good, yet he thought that in every case which resisted the action of myotics, and perhaps paracentesis also, an iridectomy should be done without delay, and in these early cases he had never had a bad result. If the fields were much contracted, and the discs atrophied, he thought that in spite of all treatment, as a rule, the disease progressed.—*British Medical Journal.*

ABSTRACTS FROM MEDICAL LITERATURE.

By W. A. SHOEMAKER, M.D.,

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THE REMOVAL OF FOREIGN BODIES FROM THE EYEBALL.

Charles Lukens (*Annals of Ophthalmology*, July, 1900) reports eighteen cases, and draws the following conclusions:

1. The crystalline lens has proved itself to be the most tolerant of a foreign body.

2. The phagocytic power in healthy eyes is very strong.

3. All foreign bodies should be removed from the interior of the globe as quickly as possible, especially if they are situated near any of the fixed tunics of the eye, as they are very apt to become encysted and apparently to become innocuous for irregular periods of time, and then missed and allowed to remain until at some future time, by reason of traumatism or atrophying processes, they are again set loose and excite most disastrous influences upon the organ itself, or even upon its fellow.

4. Whenever possible the wound of original entry should be used for the extraction of the foreign body.

5. Skiagraphs giving the exact location of the foreign mass are, in the present day of aseptic surgery, absolutely indispensable when the foreign body can not be seen by the ordinary instruments of precision.

6. Cases of doubtful foreign material, in which no history as to the nature of the object can be obtained, should first be submitted to skiagraphic study, and should the mass prove to be steel or iron, magnets can be safely employed, followed in some cases by the use of forceps. (In this series the electro-magnet of Hirschberg was employed).

7. Particles of other metals, after localization, should always have the attempt made with the forceps for their removal.

8. The presence of copper or stone within an eye gives the most unfavorable results.

9. Wounds in the scleral region behind the ciliary zone, though, as a rule, made by objects of a large size, are primarily, if aseptic, of less danger and damage to the organ than those, even though much smaller, which penetrate and injure the tissues of the anterior segment of the globe.

10. Primary treatment, pending operative interference, in uninfected cases, should be palliative and antiphlogistic, consisting of rest in bed, iced compresses, atropine, boric acid washes, etc.

These rules, says the author, hold good no matter to what extent the traumatism has affected the organ, or to what degree the removal of the humors has taken place, as many eyeballs have been saved which have been considered useless by hasty judgment—eyeballs that have proved valuable to their possessors for visual purposes.

TOBACCO AMBLYOPIA.

Henry A. Polkenhorn (*Ophthalmic Record*, July, 1900) does not agree with the statements made by most observers that the vision seldom, if ever, falls below $^{20}/_{cc}$. He thinks in one-half of his cases the vision was below this figure. Most of his patients were pipe smokers, and nearly all made use of a short clay pipe, the stem being only about one and a half or two inches in length. More nicotine is absorbed in using such a pipe than when using one with a longer stem. In one case the patient was a female who had every symptom of the disease, but did not smoke. She spent most of her time in a room with her invalid husband, who was a constant smoker. Whether this was a true case of tobacco amblyopia, caused by the inhalation of tobacco smoke when her health was below par, the author was not able to positively determine.

The part played by alcohol in this disease is, he thinks, overestimated; in his opinion tobacco is responsible. The prognosis when there is no actual scotoma or contraction of the visual field, and the patient is willing to obey instructions is, he thinks, good.

OCCURRENCE OF RETRACTION MOVEMENTS OF THE EYEBALL TOGETHER WITH CONGENITAL DEFECTS IN THE EXTERNAL OCULAR MUSCLES.

Julius Wolf (*Archives of Ophthalmology*, May, 1900) summarizes his paper as follows; Retraction movements of the human eye have been described in only seven cases, to which five are herewith added. The retraction movements never occur as a solitary symptom, but always form part of the same group of clinical symptoms, producing a well-defined clinical picture, whose characteristics are as follows: The condition is always congenital. Retraction occurs during attempted adduction, which may be absent or present, but is always less than normal. Retraction is accompanied by narrowing of the palpebral fissure. Partial or complete paralysis of the external rectus of the retracted eye is regularly present. Some cases present a moderate constant retraction and narrowing of the fissure even in the primary position. In these cases attempts at abduction produce a propulsion of the globe and widening of the fissure. When the retraction is considerable the cornea is turned upward in some cases, downward in others, even when the fellow eye makes a purely lateral movement. This is due, probably, to resistance made by the optic nerve. Two explanations are offered to account for the retraction; the faulty insertion and the fixation theories. Though the former is supported by some evidence, the latter accounts more satisfactorily for all the symptoms and is even better supported by evidence. Surgical interference may benefit some of the cases. There is reason to believe that the retraction movements are often overlooked and that these cases are not so rare as the small number reported would indicate.

CONDITIONS REQUIRING THE ENUCLEATION OF THE EYEBALL.

Edward S. Lauder (*Bulletin of the Cleveland General Hospital*, January, 1900) gives the following conditions requiring enucleation:

1. Intraocular malignant tumors.

2. The presence of a foreign body impossible to be removed.

3. Injury to the eye precluding possibility of recovery—such as rupture of the eyeball from the result of a blow, though recovery may be possible even in some of these cases.

4. Where there is a condition of epiocular malignant tumors and also orbital tumors, which threaten life, but which can not be removed without destroying the eye.

5. Cases of disease which cause intolerable pain and which render the eye incurably blind. This condition is sometimes met with in irido-cyclitis, phthisis bulbi and in glaucoma absolutum. In this case operation should be performed only as a last resort after every other less radical operation has proved fruitless.

OPTIC NEURITIS IN CHLOROSIS SIMULATING CEREBRAL TUMOR.

A. Engelhardt (*Münchener medicinische Wochenschrift*, September 1, 1900) reports the case of a young woman with pronounced symptoms of cerebral tumor who was under observation for a year. At the autopsy the discovery was made that, except for unusual anæmia and dryness, the brain was normal. The optic nerves were very much degenerated, and on recalling all the symptoms, the conclusion was evident that the case was one of chlorosis and secondary neuritis. The chlorosis had been vaguely suspected in life, but had been so overshadowed by the assumed brain tumor, that treatment had been considered superfluous. The patient probably died of direct inanition, as she had refused all food during the last few weeks and, owing to the completely erroneous diagnosis, no attempt had been made to feed her artificially.

VENOUS PULSATION IN THE FUNDUS OCULI

M. F. Weyman (*Ophthalmic Record*, August, 1900) after two years' study of the subject draws the following conclusions: Venous pulsation on or about the disc is very common, perhaps more frequent under ordinary physiological conditions. It is most easily seen in physiologic excavations, and where the veins twine around the arteries or make a loop as they emerge from the crater-like center of the disc. In such places the veins look darker, owing to the doubling

of the blood-column due to superimposition. The venous pulsation differs from the arterial pulse seen in hypertension of the ball. The latter is a true pulse, quick and flashlike, synchronous with distended arteries, while the former, though equally frequent, is not thus synchronous. It appears later, is slow and heaving, and easily followed in its wave. It is most prominent where the veins are largest and is lost as the caliber diminishes, hence the condition is not a true wave caused by internal distension. It is not a true pulsation, but is without doubt produced by such. The pulse expansion compresses the lumen of its accompanying vein, which action, in damming up the venous flow, becomes more accentuated by the circumstance that it travels in the direction opposite to the venous current. Whenever the two vessels are sufficiently far apart, no such effect can be produced.

A CASE OF TRANSIENT SPASTIC CONVERGENT STRABISMUS.

Samuel Theobald (*New York Medical Journal*) says spastic convergent strabismus, or strabismus from tonic spasm of the internal recti, must be sharply distinguished from ordinary concomitant convergent squint and from squint due to paralysis of the abducens. It is one of the well-recognized ocular manifestations of hysteria, but apart from this, it would seem, deserves to be regarded as a rare anomaly to which text-books give scant attention.

After describing his case, the author says that the squint in this case was a purely spastic one, due, doubtless, to an irritation (of influenzal origin) of the innervation center which controls the associated action of the internal recti muscles. This is, in his judgment, not open to question. Had it been a concomitant squint, precipitated by the attack of influenza, as he at first supposed, it might, indeed, have disappeared under the influence of the atropine and with the improvement in the patient's general condition; but, under such circumstances, a normal muscle balance would certainly not have been re-established in the space of a few days, as actually happened. On the contrary, a marked, and probably persistent esophoria would certainly have been encountered.

As to abductor paresis, there were no signs whatever pointing in this direction; but, apart from this fact, the rapid return of the lateral muscles to a condition of practical orthophoria, was as little consistent with this view of the case as with the view that the squint was a concomitant one.

OCULAR HEADACHES.

W. A. Brailey (*British Medical Journal*, August 11, 1900) discussing ocular headaches, says muscular errors, especially the accommodative movements, are by far the most important; other influences are glare and sudden changes in the amount of light. Defects in accommodative movements are responsible for most of the ocular headaches. Errors of the extrinsic muscles produce headache, but less so than do the accommodative muscles, though more migraine, more dizziness and more general distress. It is a general law that the greater the amount of ocular error, the less the tendency to headache. Both spasm and headache are produced more by moderate amounts of errors of refraction, especially if it be astigmatism, and most of all if it be astigmatism with asymmetry of the axes.

OPERATIONS FOR SECONDARY CATARACTS.

Peter A. Callan (*Journal of the American Medical Association*, October 13, 1900) thinks that at least one-third of all cataract extractions require a secondary operation to obtain satisfactory vision. He would do a secondary operation in cases with $^{20}/_{XL}$ vision, providing the patient is willing to assume his share of the risk. When the vision is $^{20}/_{LXX}$ or less, he suggests to the patient the advisability of an operation to improve the sight. The author counsels against operating too soon after the extraction. The two great dangers of the operation are (1) infection, (2) traumatism exerted on the ciliary processes. The latter is to be avoided by *cutting* and not *tearing* the membrane. When the pupillary membrane is thin and veil-like, the author uses Knapp's needle according to his method. When it is thick and tough, he prefers DeWecker's forceps-scissors to Bowman's method of using two needles.